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Water-absorbing polymer saves on water use while improving the performance of selected cereal crops, leafy and fruit vegetables

Elisha Otieno Gogo

Pwani University, Crop Sciences, Kenya

Abstract

Drought and soil fertility are major problems in Kilifi county, Kenya. This affects yield of various crops grown in the region. The present study aimed at studying the effects of water absorbing polymer (herein referred to as GR42®) on soil moisture conservation, growth and yield of selected cereal crops (i.e. maize and sorghum) leafy vegetables (i.e. amaranthus, African nightshade, swiss chard, and kales), fruit vegetables (i.e. eggplant, tomato and capsicum). The experiment was done at Pwani University farm, Kilifi, Kenya in a randomised complete block design with three replications. The treatments were: i) soil mixed GR42® and ii) soil without GR42® (control). Three weeks after planting (or transplanting), watering on plots with GR42® was reduced by 80 % and continued until harvest. Data was collected on chlorophyll content, leaf number, plant height (growth) and fresh weight (yield). Soil moisture, temperature, relative humidity and rainfall was also recorded throughout the experiment. Data was subjected to analysis of variance and significance means separated using Fisher's protected LSD test at $p = 0.05$. Results revealed that the GR42® helped to preserve soil moisture in all the tested crops by 8.9 % to 12.6 % compared with the control. The GR42® helped to improve leaf chlorophyll (13.1 % to 31.6 %), leaf number (10.8 to 58.2 %), plant height (10.5 % to 41.2 %) and yield (28.6 % to 76.8 %) of all the tested crops despite reducing water by 80 % compared with the control. The findings show the potential of using GR42® in the production of crops while saving on water use in drought prone areas like Kilifi county.

Keywords: Climate-smart agriculture, crop growth, crop yield, soil amendment, soil fertility, soil moisture conservation, water saving

Contact Address: Elisha Otieno Gogo, Pwani University, Crop Sciences, P.O. Box 195, 80108 Kilifi, Kenya, e-mail: e.gogo@pu.ac.ke